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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,931	03/31/2004	Edoardo Campini	42P19177	5799

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EXAMINER

PAPE, ZACHARY

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

E/V

Office Action Summary	Application No. 10/813,931	Applicant(s) CAMPINI ET AL.	
	Examiner Zachary M. Pape	Art Unit 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5, 10, 11 and 28 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9, 12-15, 17-27, 29 and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Attached annotated drawing.</u> |

Response to Amendment

The following detailed action is in response to the correspondence filed 10/28/2005.

The objection to claims 5, 19 and 20 have been withdrawn in view of the newly amended claim language to said claims.

The 112 rejection of claim 16 has been withdrawn since claim 16 has been canceled.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-9, 12-15, 18-23, 25-26, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yin (US 6,160,707) in view of Foo et al. (US 6,304,437).

With respect to claims 1, 19, and 25 Yin teaches an apparatus, comprising: a printed circuit board (10c/10M), including, at least one set of integrated circuit (IC) pads, each set of IC pads to electrically couple one of an IC or a socket configured to receive an IC to the PCB (There must inherently be a set of pads to couple the IC to the PCB in order to supply power to the IC); and first and second power rails (12R, 12L), each mounted to the PCB (As illustrated in Fig 2b) and electrically coupled to a portion of said at least one set of IC pads (Via 10E and 12E), wherein the first and second power rails

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(12L, 12R) are respectively disposed on opposite sides of said at least one set of IC pads (As illustrated in Fig 1) and each power rail has a slotted profile including at least one slot configured to receive a flange (14R) on a heat sink (14R, 14H).

Yin fails to teach a set of power supply pads to electrically couple one of a power module, power supply circuitry, or connector configured to receive a power module to the PCB, wherein each power rail is connected to the power supply pads. Foo et al. teaches the use of a power supply (31) and pads (30, 32) to electrically couple the power supply (31) to the PCB (The PCB receives power from the power supply by coupling the power supply to sockets 22, which then deliver the power to the DSIMM sockets 23). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the power supply and attachment means of Foo et al. with the PCB apparatus of Yin as a means to supply power to the IC and PCB of Yin. Supplying power to the IC and PCB of Yin allows the system to operate.

With respect to claim 2, Yin further teaches a first IC (10H), coupled to a first set of IC pads (The IC must inherently be coupled to IC pads in order to connect the IC to the power supply); and a first heat sink (14H, 14R which in combination act as a heat sink) having a flange (14R) slidingly engaged with a respective slot in each of the first and second power rails (As illustrated in Fig 2b).

With respect to claim 3, Yin further teaches a means (14) for thermally coupling the first heat sink to the first IC.

With respect to claims 6 and 23 Yin further teaches a second IC (adjacent 10H), coupled to a second set of IC pads (The second IC must inherently be couple to a set of

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IC pads in order to provide power from the PCB to the IC), but fails to teach a second heat sink. It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the one heat sink as taught by Yin, since it has been held that constructing a formerly integral structure (such as the heat sink of Yin) in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. Separating the heat sink of Yin into two separate heat sinks would allow for more specific cooling of each IC. That is to say that the heat sink could be placed in an area of the first IC (10H) and another in the area of the second set of IC's (adjacent to 10H) to perform cooling only in those specific areas, thus reducing the amount of heat sink required, reducing costs in manufacturing the heat sink.

With respect to claim 7, Yin further teaches a first IC socket (Adjacent 10E), coupled to a first set of IC pads (To supply power from the power supply to the IC pads); a first IC (10H) coupled to the first IC socket, and a first heat sink (14 and 14H), having a flange (14R) slidably engaged with a respective slot in each of the first and second power rails (As illustrated in Fig 2b).

With respect to claims 8 and 9, Yin further teaches a second IC socket (10E), couple to a second set of IC pads (inherently required in order to provide power to the IC pads and ultimately to the IC), a second IC (Adjacent 10H) coupled to the second IC socket (in order to provide power to the IC, it must be connected to said IC pads, which further provide power from 10E), Yin fails to teach a second and third heat sink. It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the one heat sink as taught by Yin, since it has been held that

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constructing a formerly integral structure (such as the heat sink of Yin) in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. Separating the heat sink of Yin into two separate heat sinks would allow for more specific cooling of each IC. That is to say that the heat sink could be placed in an area of the first IC (10H) and another in the area of the second set of IC's (adjacent to 10H) to perform cooling only in those specific areas, thus reducing the amount of heat sink required, reducing costs in manufacturing the heat sink.

With respect to claim 12, Yin further teaches a pair of elongated pads formed on a top layer of the PCB, wherein a base of each of the first and second power rails is electrically-coupled to a respective elongated pad (There must inherently be an electrically conductive pad that connects the base of the power rails to the PCB and ultimately to the IC's).

With respect to claims 13, there must inherently be power supply circuitry coupled to the PCB (10c) in order to supply power from the connectors (10E and 12E) to the IC's (10H).

With respect to claims 14, there must inherently be a power module connector coupled to the PCB (10c) in order to supply power from the connectors (10E and 12E) to the IC's (10H).

With respect to claim 15, Yin further teaches that the apparatus comprises a computer equipment board.

With respect to claim 18, Yin further teaches an elongated heat sink (Comprising 14 and 14H) running substantially the length of the first and second power rails (As

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illustrated in Fig 1) and having flanges on opposing sides (14R and 14L) slidably engaging respective slots in the first and second power rails (As illustrated in Fig 2b).

With respect to claim 20, Yin further teaches a first heat sink (Comprising 14 and 14H), having flanges on opposing sides (14L and 14R) slidably respectively engaging slots defined in each of the first and second power rails and disposed proximate to the first IC (As illustrated in Fig 1), and means (Flanges 14L and 14R) for securing the first heat sink to the first and second power rails. (As illustrated in Fig 2b)

With respect to claim 21, Yin further teaches a means for thermally coupling the first IC to the first heat sink (The heat sink (14, 14H) is coupled to the PCB (10C) as shown in Fig 2A).

With respect to claim 22, Yin further teaches a means (Flanges 14L and 14R) for thermally coupling at least one of the first and second power rails to the first heat sink while electrically insulating said at least one of the first and second power rails from the first heat sink (As illustrated in Fig 2a-b, the power rails are directly coupled to the heat sink (14) via 14L and 14R, and the heat sink is electrically insulated since the heat sink does not directly touch the electrical connectors 10E and 12E).

With respect to claim 26, Yin further teaches routing power to a second integrated circuit (Adjacent 10H) on the PCB (10C) via the first and second power rails (The power rails contain the electrical connectors (12E) which connect to the electrical connector of the PCB (10E) thereby supplying power to the IC's), and thermally coupling the first heat sink to the second IC by slidably engaging flanges on opposing sides of the first heat sink or second heat sink with slots defined in the first and second

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power rails (As illustrated in Fig 2b, the heat sink is coupled to the IC's by the PCB via rails 12R and 12L since the rails hold 14 and are required to align the PCB such that 10E and 12E mate).

With respect to claim 29, Yin in view of Foo et al. further teaches routing a first power output [I.E. 1 of the 3 outputs (32)] provided by a power supply coupled to the PCB (The power supply (31) is coupled to the PCB for at least the reason that the pads (32) of Foo et al. are coupled to the PCB) to the first power rail; and routing a second power output [I.E. a second of the 3 outputs (32)] provided by the power supply to the second power rail (The first and second power rails must receive power from the power supply in order for the IC's to operate).

Claim 30 rejected under 35 U.S.C 103(a) as being unpatentable over Yin in view of Foo et al. and further in view of Boaz et al. (US 6,137,709).

With respect to claim 30, Yin in view of Foo et al. teach the limitations as applied to claim 29 above, but fails to teach that the first power supply output is a supply voltage to the IC and the second power output comprises a ground. Boaz et al. teaches the conventionality of having both a supply voltage and a ground (Abstract) as part of a PCB/IC system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Boaz et al. with the teachings of Yin and Foo et al. to provide power and a ground to the PCB and IC's of Yin. Providing a supply voltage and a ground will enhance the performance of the PCB and IC's (Boaz et al. abstract).

Claims 4, 17, 24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yin in view of Foo et al. and further in view of Hassanzadeh et al. (US 6,520,805).

With respect to claims 4 and 27, Yin in view of Foo et al. teach the limitations as applied to claim 2 above, and further teaches a means for electrically isolating the first heat sink from at least one of the first and second power rails while thermally coupling the first heat sink to said at least one of the first and second power rails (As illustrated in Fig 1 of Yin, the heat sink (14R/14S) is thermally coupled to the power rails but is not electrically connected to them, since the connector 12E is occupied by 10E), but fails to teach that the first and second power rails are to carry different voltages. Hassanzadeh et al. teaches the conventionality of using different voltages within a power rail to power an IC (As illustrated in Fig 1, and further detailed in Column 2, Lines 35-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the multiple voltage teachings of Hassanzadeh et al. with the power supply and power rails of Foo et al. and Yin respectively to provide multiple voltages to a variety of IC's. Providing the multiple voltages as taught by Hassanzadeh et al. will allow the manufacturer to place multiple types of IC's on one PCB thereby reducing the amount of space required within a computer system.

With respect to claim 17, Yin in view of Foo et al. teach the limitations as applied to claim 1 above, but fails to teach that at least one of the first and second power rails comprises a split power rail including first and second conductive sections separated by an insulator section. Hassanzadeh et al. teaches the conventionality of having a split

power rail including first (291) and second (292) conductive sections separated by an insulator section (270A). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the split power rail of Hassanzadeh et al. with the power supply and power rails of Foo et al and Yin respective to provide a means of supplying multiple voltages to the IC's (Column 2, Lines 35-44).

With respect to claim 24, Yin in view of Foo et al. teach the limitations as applied to claim 19 above, but fails to teach that at least one of the first and second power rails comprises a split power rail including first and second conductive sections separated by an insulator section, the apparatus further comprising: means for electrically coupling power outputs from the power supply means to each of the first and second conductive sections of each split power rail, means for electrically coupling each of the first and second conductive sections of each split power rail to the first IC. Hassanzadeh et al. teaches the use of a split power rail (280) including first (291) and second (292) conductive sections separated by an insulator section (270A). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the split power rail of Hassanzadeh et al. with the power supply and power rails of Foo et al and Yin respective to provide a means of supplying multiple voltages to the IC's (Column 2, Lines 35-44). Additionally, both Yin and Hassanzadeh et al. teach a means for electrically coupling power outputs from the power supply (21 of Foo et al.) to each of the first and second conductive sections of each split power rail (There must inherently be a means to electrically connect the power supply to the power rail in order to provide power to the IC's), and a means for electrically coupling each of the first and

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second conductive sections of each split power rail to the first IC (Hassanzadeh et al; Fig 2a, 265).

Allowable Subject Matter

2. Claims 5, 10, 11, 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

3. With respect to claim 5, the allowability resides in the overall structure of the device as recited in dependent claim 5 and at least in part because claim 5 recites, "a thermally conductive, non-electrically conductive coating"

The aforementioned limitations in combination with all remaining limitations of claims 1, 2, 4 and 5 are believed to render said claim 5 patentable over the art of record.

4. With respect to claim 10, the allowability resides in the overall structure of the device as recited in dependent claim 10 and at least in part because claim 10 recites, "the first and second power rails have a profile including a plurality of slots disposed at different heights"

The aforementioned limitations in combination with all remaining limitations of claims 1 and 10 are believed to render said claim 10 patentable over the art of record.

5. With respect to claim 11, the allowability resides in the overall structure of the device as recited in dependent claim 11 and at least in part because claim 11 recites, "an embedded heat pipe" as defined by the applicant in the specification page 14, Lines 13-23.

The aforementioned limitations in combination with all remaining limitations of claims 1 and 11 are believed to render said claim 11 patentable over the art of record.

6. With respect to claim 28, the allowability resides in the overall structure of the device as recited in dependent claim 28 and at least in part because claim 28 recites, "a heat pipe" as defined by the applicant in the specification page 14, Lines 13-23.

The aforementioned limitations in combination with all remaining limitations of claims 25, and 28 are believed to render said claim 28 patentable over the art of record.

Response to Arguments

7. Applicant's arguments filed 10/28/2005 have been fully considered but they are not persuasive.

With respect to applicants' remarks regarding claims 1, 19, and 25 that, "Yin does not disclose, teach or suggest that the retaining posts 12L or 12R do or should supply any power to the PCB 10C, nor that these retaining posts are coupled in any way to an electrical power source" the examiner respectfully disagrees. The examiner directs the applicants' to the drawing attached hereto illustrating the examiners interpretation of the first and second power rails of Yin. As annotated by the examiner the first power rail (12R) consists of the post labeled 12R as well as the base portion

which is formed as part of the post 12R. Similarly, the second power rail (12L) consists of the post labeled 12L as well as the base portion which is formed as part of the post 12L. In other words the entire body (12L, 12R, and 12M) comprise the set of power rails. When viewed in this context, the power rails do in fact provide power to the printed circuit board through 12E and 10E (That is, power is supplied to 12E from, for example, a computer power supply, and 12E supplies power to 10E which in turn supplies power to the PCB (10c) and any components thereon).

With respect to applicants' remarks that the "retaining posts 12L and 12R do not receive a flange on a heatsink" the examiner respectfully notes that applicants' claim 1 recites, "each power rail has a slotted profile including at least one slot configured to receive a flange on a heatsink" which is narrative in form. For this reason the examiner has given patentable weight to each power rail having a slotted profile (the slot which receives thermal plate 14), however the recitation, "configured to receive a flange on a heatsink" has been given little patentable weight. In order to be given patentable weight a function recitation must be expressed as a "means" for performing the specified function, as set forth in 35 U.S.C. 112 6th paragraph, or must be supported by recitation in the claim of sufficient structure to warrant the presence of the function language. See *In re Fuller*, 1929 C.D. 172; 388 O.G. 279. Therefore it is only necessary that the slotted profile of Yin be able to perform the function of receiving a flange on a heatsink. Clearly the power rails of Yin can perform such a function.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

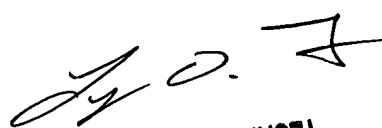
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary M. Pape whose telephone number is 571-272-2201. The examiner can normally be reached on Mon. - Thur. & every other Fri. (8:00am - 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached at 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ZMP


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